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THE APHASIAS

AND

THEIR MEDICO-LEGAL RELATIONS.

BY
F. W. LANGDON, M. D.
CINCINNATI.

Member of The American Neurological Association, The Neurological
Society of London, The Academy of Medicine
of Cincinnati, etc.

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READ BEFORE THE OHIO STATE MEDICAL SOCIETY AT ITS FIFTY-SECOND
ANNUAL MEETING AT CLEVELAND, OHIO, MAY, 1897.

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TO
SIR WILLIAM R. GOWERS,
IN GRATEFUL REMEMBRANCE OF MANY KINDNESSES AND
VALUABLE INSTRUCTION RECEIVED
AT HIS HANDS.

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THE APHASIAS

AND THEIR MEDICO-LEGAL RELATIONS.¹

BY

F. W. LANGDON, M. D.

When Broca, in 1861, announced the localization of the faculty of spoken language, in the left third frontal convolution, he marked the beginning of an epoch in the delimitation of brain functions, of which we are perhaps approaching the end.

His observations—limited to motor speech-processes—have been extended by a host of observers,² until at the present time no less than twenty-eight distinct varieties of speech-disorder may be said to exist. (See table p. 16a)

Each one of these possesses its own importance, either in its purely scientific, its clinico-therapeutic or its medico-legal aspects.

(1) In the preparation of this paper use has been freely made of the chapter on "Speech Disorders" contributed by the writer to *The American Text-Book of Legal Medicine*—Saunders, Philadelphia, 1897. (In press.)

(2) The writings of Broca, Trousseau, Charcot and others in France; of Wernicke, Kussmaul and Simon in Germany; Meynert and Benedict in Austria; Hughlings Jackson, Broadbent, Gowers, Bastian and others in England; and of Austin Flint, Bigelow, Starr, Mills, Eskridge and others in our own country, have been freely utilized in the present paper.

The most important general works on the subject in the English language are those of Bateman "On Aphasia," etc. London, 1890; and Wylie "The Disorders of Speech," Edinburgh, 1894. Since this article has gone to press another important volume has appeared, entitled "Aphasia and the Cerebral Speech Mechanism," by William Elder, M. D., etc., London, Lewis, 1897.

NORMAL SPEECH PROCESSES.

By common consent the term "speech" as a cerebral function, has come to be synonymous with "language," although the two are, evidently, quite distinct, language bearing the same relation to spoken speech that music does to dancing, *i. e.*, it *decides the movement* by which it is expressed. It is in the sense of the reception, elaboration and emission of *language*, therefore, that the term speech is here used.

Normal speech, in this sense, embraces the capacity to correctly *receive, understand* and *convey* to others, *ideas*, represented by words, which words may be either spoken, written, printed or indicated by signs.

To use a familiar example the idea of a fish—correctly received, understood and expressed comprises: (See Fig. 1.)

(1) **Reception** of sensory impressions conveyed through organs of sight, smell, taste, hearing, touch, weight and temperature senses, to appropriate brain areas, where they become percepts.

(2) **Association** or combination of these various sensory impressions and other percepts and concepts, *i. e.*, water, cooking, dishes, etc., to make the "concept" or idea "*Fish*." Here also would come the association with its name—considered by some (Mills,* Broadbent, Charcot, Kussmaul,) to be a distinct faculty in itself.

(3) **Expression**, composed of two distinct factors, viz.: First, the purely "psychic" act of word-construction or planning, comparable to the planning of a house by the architect; secondly, *psycho-motor* or executive processes, leading to *emission* of the word fish—either spoken, written, printed, drawn in outline or indicated by pantomime. These latter processes are analogous to the building of the house by various workmen from the plans previously made.

*A text-book of Nervous Diseases by American Authors—Phila, Lea, 1895, p. 427.

Expression here resembles all the other known forces in that it is merely a "mode of motion."

The diagram (Fig. 1) shows in concise form the general relations of the processes just mentioned.

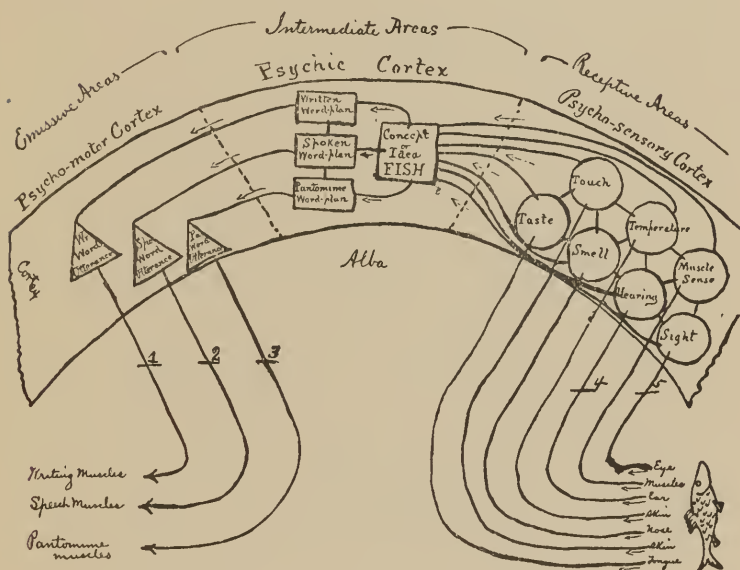


FIG. 1. Scheme of receptive, intermediate and emissive mechanisms of normal speech.

Numbers 1, 2, 3, 4, 5, indicate situations of sub-cortical lesions destroying reception or emission by one or more paths without impairing sensory memories, concept memories, language construction or utterance memories.

It should be clearly understood that the circles, squares, triangles, etc., do *not* represent groups of neurons (cells) but more probably "fields of conjunction" of neuron processes or "end-tufts." See Fig. 4, in illustration of this.

According to modern and generally accepted doctrines,

the anatomical and physiological units of the nervous system are structures called *Neurons*.† (Fig. 2).

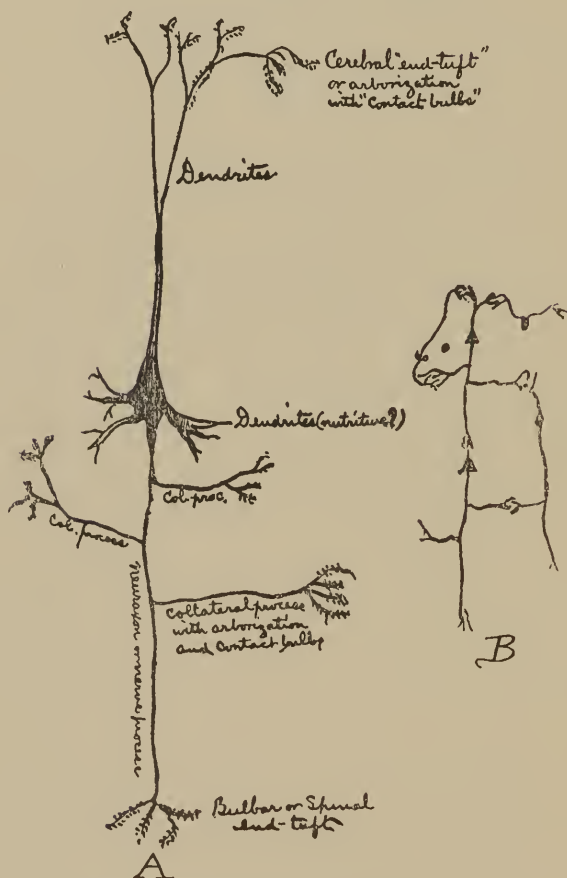


FIG. 2. The Neuron of Waldeyer. A, "pyramidal" neuron of the motor cortex, highly magnified (semi-diagrammatic).
B. Communications of neurons with each other by means of end-tufts (or arborizations). The contact bulbs or "gemmules" are omitted in the small figure.

†It may be well to state that the term neuron is here used in the sense indicated by Waldeyer. Some confusion respecting the scope

THE NEURON.

These are protoplasmic structures, microscopic in size, consisting of an enlarged portion called the "body" (formerly known as a nerve "cell") from which proceed elongated processes in various directions. These processes present near their terminations small swellings called "gemmules" or "contact bulbs,"[†] by means of which impressions are presumed to pass from neuron to neuron throughout the nervous system. In normal speech processes chains of such neurons, commonly composed of two or three individuals linked together, conduct sensory impressions from without to the brain cortex, where they become a part of consciousness. Here neurons, parts of neurons or other chains of neurons, convert percepts into concepts (ideas), concepts into word-plans and word-plans into motor impulses; these motor impulses are transmitted through other (outgoing) chains of neurons, to the various muscles of respiration, phonation, and articulation to produce spoken words. Presumably, each neuron and each chain of associated neurons possess a separate and distinct function, though this is not, at present, susceptible of actual proof as regards speech processes. It is probable that the more numerous and complete the communications and inter-relations of the neurons, the more varied will be the sources of language and the more perfect its elaboration, other things being equal. Differences in the complexity of organization and inter-relations of neurons therefore probably constitute the natural differences in individ-

of the term exists by reason of the fact that Schafer and perhaps some other writers have applied the term "neuron" to the neur-axon (one of the neuron processes). Waldeyer's nomenclature however is now generally accepted throughout the world.

[†]There are strong reasons in favor of the view that these "contact bulbs" possess the functions of extension and retraction, by "amoeboid" movement or otherwise, and that to this movement is due the "make" and "break" of contact and consequently of function observed in various states. (Vide, Dercum, *Journal Nervous and Mental Disease*, 1896, p. 513.)

uals as regards range and command of language. It is probable that the subject of speech disorders will eventually be considered from the standpoint of the neuron, as nervous diseases in general now are.

At present however, for practical purposes, the areas of brain cortex which are especially concerned with speech processes are five in number and, as shown in the accompanying diagram (Fig. 3), they are only educated for speech purposes on the *left half* of the brain in *right handed* persons. In most left-handed persons probably the right-half contains the speech mechanism.

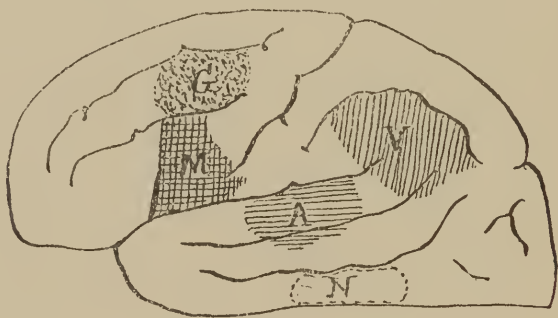


FIG. 3. Modified from Wylie.

Left cerebral hemisphere showing receptive speech areas (A), word-hearing, (V), word-seeing; and emissive speech areas (M), motor; (G), graphic. A fifth area (N), intermediate in order of function between the receptive and emissive areas, has been described by Mills and McConnell as the "naming" or "concept" area (*Jour. Nerv. and Ment. Dis.*, Jan., 1895, p. 1) and a case recorded to favor this view. See also foot note on p. 26.

Connections (commissures) by means of associative mechanisms are believed to exist between each of these areas. These connections are probably paired, e. g., one set passing from A to V, another from V to A. Lesions of these commissures cause the various forms of paraphasia, (intermediate or "conduction" aphasia).

In these areas presumably, the neuron processes concerned in the various subdivisions of the speech process are grouped—each subdivision to a considerable extent aggregated, but connected by neuron-processes of various

kinds (collaterals, dendrites, etc.,) with each of the other groups. According to modern views the chief seat of nervous activities proper (sensation, motion, thought, etc.,) is at the points of contact between the end-tufts (fields of conjunction); not at the neuron-bodies ("nerve cells") as was until recently taught. The neuron-bodies, (formerly "cells") are now believed to bear chiefly a nutritive relation to the more active neuron processes. These neuron processes again are not simple homogeneous structures, but are resolvable microscopically into aggregations of minute tubules containing fluid or semi-fluid material.

To the *receptive* areas come entering sensory impulses, traversing the neuron-chains extending inward from the corresponding external sense organs (ear, eye, etc.)

From these receptive areas of the brain cortex pass neuron processes connecting one area with another and

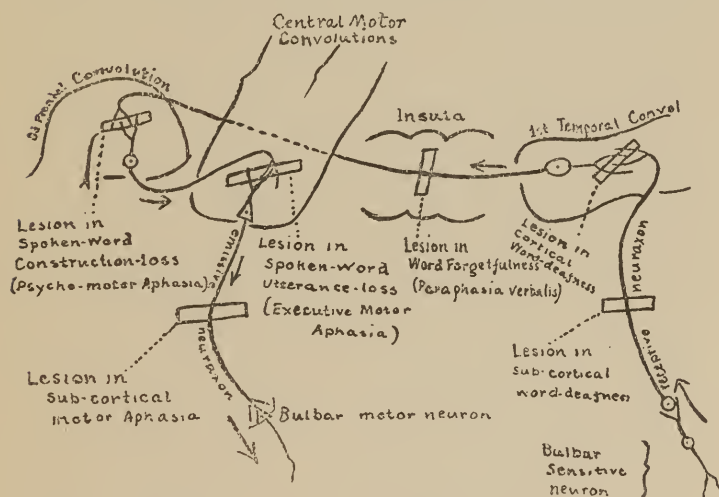


FIG. 4. Diagram to illustrate probable relations of neurons to types of aphasia, paraphasia and the motor aphasia.

A substitution of other sensory and motor areas and connections would illustrate any of the remaining types of receptive, intermediate and emissive aphasia.

with various other regions of the brain mass, (intermediate and emissive areas). Finally, from the emissive (motor) areas only, pass impulses through other neuron processes to the base of the brain (bulbar nuclei, etc.) where, communicating with a second set of motor neurons, they are conveyed to the muscles of expression which they animate and control (see Figs. 1 and 4).

Hence it follows that even a limited damage to the brain, from any cause, may impair or destroy the functions or connections of one or more groups in the language area, thus giving rise to speech defects of varying degree and importance.

The study of speech and its disorders belongs both to Neurology and to Psychology and obviously requires a knowledge of the anatomy, physiology and pathology of the brain and its connections, with capacity for judging of their activities in health and disease.

LIMITS OF LEGAL IMPAIRMENT.

The literature of the jurisprudence of aphasia, is rather sparse, in comparison with the voluminous amount of matter in print, pertaining to the subject of aphasia in general. Bateman* states that there is "no code or law as to the legal capacity of aphasics in this (Great Britain) or any other country" * * * and that "each particular case would have to be considered on its own merits." It is quite evident that the limits of legal impairment differ widely from those of impairment in a purely physiological sense. Physiologically, aphasia of any degree, is to be looked upon as a break in the relationship of the individual to his environment; hence his general intelligence must suffer to some extent. It is quite reasonable to assume however, that the degree of mental impairment in a given case may not be

*On Aphasia and the Localization of the Faculty of Speech—London 1890, p. 302.

sufficient to be classed as insanity—nor yet be such as to prohibit the transaction of ordinary business affairs, or the making of a valid will. It is quite evident that one of the receptive centres may be damaged or destroyed without necessarily abolishing the function of others. One receptive area then may take the place of another that is disabled—sight for instance by enabling the subject to receive ideas by written, printed or sign language, may compensate for loss of word-hearing. A tailor for example may not recognize the spoken word *coat* though he hears it as a sound; he may however recognize the printed or written word, and also recognize the coat when seen and know its use and value. Such a case is here cited (see p. 38).

Even with the hearing and visual areas both destroyed by disease or absent from congenital defects, it may still be possible for the patient to recognize words by the muscular sense, as in the act of tracing the letters with his hands. The education of the individual would here be an important factor in deciding a given case, since a person who could not write could not avail himself of the help of graphic and muscular sense association.

An example of extensive replacement of the auditory and visual receptive mechanisms by the tactile and muscular senses is furnished in the case of Miss Helen Keller who recently passed with credit the entrance examinations to Radcliffe, (Women's Annex to Harvard College).

For the following notes on this case the writer is indebted to the courtesy of Mr. Michael Anagnos Secretary of the Perkins Institution and Massachusetts School for the blind, where the young lady received her education. Miss Keller who is now (Oct. 1896) aged sixteen years and four months, lost her sense of hearing (peripheral?); from a severe fever at the age of nineteen months; shortly after this she ceased to speak. She was taught to read the words of a speaker by placing two of her fingers on his lips; also by the "manual alphabet," (for deaf and dumb). She

conveys language to others by the manual alphabet, and by articulation of words learned by the lip-touching process above-mentioned. Her articulation is said to be very distinct. Her senses of smell, taste and temperature are highly developed and her powers of memory are unusual.

Smell and taste are of less importance in the construction of language, being applicable to a more limited range of concepts than hearing, sight and muscular sense. In rare cases however, their conditions may be of importance as bearing on the presence of hallucinations or illusions that would impair the reliability of the individual in a given case.

The question of the location of special psychic word-smelling and word-tasting centres cannot, in the present state of our knowledge be raised. Word-feeling areas would seem to have a necessary existence in educated deaf-blind persons, but their location remains unknown, though supposed to be in the sub-parietal gyrus (Inferior Parietal convolution) and callosal gyrus (Gyrus fornicatus) of the left hemisphere.

It is quite evident from these general considerations, that a conclusive opinion in a given case, is only admissible after a thorough examination of the functions of the receptive, intermediate and emissive mechanisms, by a competent neuro-psychologist.

It should not be forgotten that the language defects of some aphasics may lead to erroneous committal to an asylum ; and eventually to civil suit for damages.

Sanity having been established, the questions of jurisprudence which are most apt to arise in cases of aphasia, fall naturally under two heads.

‘ FIRST—RESPONSIBILITY FOR ACTS DONE.

(a) Contracts already made, including contracts of marriage, business contracts and contracts made as a member

of a partnership or officer of a corporation, and affecting such partnership or corporation.

(*b*) Wills and testamentary acts.

(*c*) Acts as a public official.

(*d*) Evidence given as a witness, the value and weight to be attached to it.

(*e*) Execution of deeds, mortgages or powers of attorney.

(*f*) The involuntary use of improper or obscene language, (as in the case cited on p. 17).

SECONDLY—COMPETENCY TO LEGALLY PERFORM PROPOSED ACTS.

(*a*) To make contracts in an individual capacity or as a member of a firm or officer of a corporation—and to carry on business generally.

(*b*) To make a will or codicil or to vary the terms of former testamentary acts.

(*c*) To exercise the functions of a public official.

(*d*) To testify in judicial or quasi-judicial proceedings.

(*e*) To execute deeds, mortgages or powers of attorney.

(*f*) To choose place of domicile; to acquire a settlement in a poor district, or an eleemosynary institution.*

DISORDERS OF SPEECH-PROCESSES.

Passing to a consideration of the disorders of speech—from brain disease or injury: The term Aphasia is used as a general expression to signify speech loss, partial or complete, whether affecting the receptive (sensory) elements, the intermediate (constructive) apparatus, or the emissive (motor) mechanism of the brain cortex.

The following scheme of varieties of Aphasia may be found useful as indicating the relationship of the various

*For valuable suggestions regarding the above legal relations of aphasia, the writer is indebted to Mr. Joseph Cox Jr. of the Cincinnati Bar.



FIG. 5. Left cerebral hemisphere, outer surface.

Localization of aphasias; O receptive, □ intermediate, Δ emissive. Doubtful or unverified marked ?. Numbers correspond with table, p. 16a.



FIG. 6. Left cerebral hemisphere, inner surface.
Localization as on preceding figure.

TABLE OF THE APHASIAS.

For the Location of the Lesion in Each, See Corresponding Number on Figs. 5 and 6.

Aphasia	Receptive or ("Sensory")	Auditory Aphasias..... 1. Amnesia verbalis (Word-deafness).....	Non-recognition of word sounds.
		2. Amusia (Music-deafness).....	Non-recognition of musical sounds.
		3. Auditory Apraxia (Object-deafness).....	Non-recognition of object sounds.
		Visual Aphasias..... 4. Alexia (Word-blindness).....	Non-recognition of word meanings. (May exist for printed and written words separately.)
		5. Visual apraxia (Object-blindness).....	Non-recognition of object-meanings or object uses.
		6. Visual amimia (Pantomime-blindness).....	Non-recognition of word mimicry or idea mimicry.
		Olfactory Aphasia..... 7. Cortical anosmia (Smell-memory loss).....	Non-recognition of objects by smell.
		Gustatory Aphasia..... 8. Cortical ageusia (Taste-memory loss).....	Non-recognition of objects by taste.
		Myotactic Aphasias..... 9. Myotactic alexia (Word-anæsthesia).....	Non-recognition of word-movements by finger or pen.
		10. Myotactic amimia (Pantomime anæsthesia).....	Non-recognition of mimicry by touch.
		11. Myotactic apraxia (Object-anæsthesia).....	Non-recognition of objects felt.
	Intermediate or "Conduction"	Auditory Paraphasias..... 12. Paraphasia verbalis (Spoken-word forgetfulness).....	Non-re-collection of word sounds.
		13. Paramusia (Musical-sound forgetfulness).....	Non-re-collection of musical sounds.
		14. Auditory parapraxia (Object-sound forgetfulness).....	Non-re-collection of object sounds.
		Visual Paraphasias..... 15. Paralexia (Word-meaning forgetfulness).....	Non-re-collection of word meanings. (May exist for printed and written words separately.)
		16. Visual parapraxia (Object-meaning forgetfulness).....	Non-re-collection of object meanings.
		Olfactory Paraphasia..... 17. Parosmia (Smell-memory forgetfulness).....	Non-re-collection of smell meanings.
		Gustatory Paraphasia..... 18. Parageusia (Taste-memory forgetfulness).....	Non-re-collection of taste meanings.
		Myotactic Paraphasias..... 19. Myotactic paramimia (Pantomime forgetfulness).....	Non-re-collection of mimicry movements.
		20. Myotactic parapraxia (Object-touch forgetfulness).....	Non-re-collection of feel of objects.
		Concept Aphasias..... 21. Anomia (Name-memory loss).....	Non-recognition of names of objects.
		22. Paronomia (Name-forgetfulness).....	Non-re-collection of names of objects.
	Emissive or ("Motor")	Spoken 23. Psychic motor aphasia (Spoken-word construction loss).....	Loss of psychic spoken-word plans.
		24. Executive motor aphasia (Spoken word-utterance loss).....	Loss of spoken-word motor-memories.
		Written 25. Psychic agraphia (Written-word construction loss).....	Loss of psychic written-word plans.
		26. Executive agraphia (Written-word utterance loss).....	Loss of written-word motor memories.
		Pantomimic 27. Psychic amimia (Pantomime construction loss).....	Loss of psychic word-mimicry plans.
		28. Executive amimia (Pantomime utterance loss).....	Loss of word-mimicry motor memories.



forms, though it includes some types not yet recorded as separate existences — e. g.: (9) Word-anæsthesia; (6) Pantomime blindness and (19) Pantomime forgetfulness, etc. With this tabular scheme as a working basis, a consideration, *seriatim*, of the various types of aphasia in their forensic aspects will now be in order.

THE RECEPTIVE OR SENSORY APHASIAS.

(1) **Word-deafness.** *The lesion* is in or beneath the posterior third of the first and second temporal convolutions of the *left* hemisphere. (Fig. 3. A, Fig. 4, Fig. 5. 1.) It may be due to congenital defect, softening from vascular occlusion, destruction and pressure by inflammation, abscess, hæmorrhage or tumor; and finally to degenerative changes (Paresis, senility).

Of these, by far the most frequent form is that due to softening from vascular occlusion. *The effect* on the patient is that he fails to recognize word-sounds as *words* though he hears them as *sounds*. He may also utter words but without relevancy to the words received and he fails to recognize this irrelevance. Such a person obviously cannot understand spoken speech, hence any answers he may give to oral questions have no value in a legal sense.

Much depends on the situation of the lesion in word-deafness. (a) It may destroy the cortical area itself (cortical word-deafness)—in which case the word-memories are gone and consequently of no use to the patient either in receptive or associative processes. (b) The lesion may be so situated as to merely cut off the incoming fibres (neuron-processes) *below* the cortex, (sub-cortical word-deafness, (Fig. 4) commonly accompanied by hemianopsia). In this case the word-memories exist in the cortex and may be in communication with other inlets as well as outlets. In other words, they may be *revived* by visual, gustatory, olfactory, tactile or muscular sense impressions. If so revived they may be emitted

intelligently by spoken as well as by written or mimic language, provided these other speech areas be intact.

Even in the cortical form of word-deafness it is evident that the *nature of the acts* under consideration is a factor of great weight in the decision as to competency and responsibility. For instance, in devising a will, the ordinary attachments and known natural affections of the individual may be accepted as evidence of the validity of a will which did no violence to those inclinations. In other words the emotional "tone" on which the affections depend may remain intact, even with judgment more or less at fault. This is a well recognized fact with regard to cerebral *motor* processes, where the power of "emotional" expression may animate muscles that are not under control of the will. The generally accepted explanation is that "emotional" motor processes are bi-laterally represented in the brain, and may act from either side. It is conceivable that the same relation may exist with respect to emotional "psychic" processes.

It is probably reasonable to assume therefore that testamentary capacity may exist in a given case, even where the transaction of a complicated business and the appearance as a witness in important cases might be detrimental to the interests of the patient or of society at large.

The use of outrageous, improper or obscene language by such a patient is obviously not attended with the usual responsibility for the act, as in a case recorded by Trousseau of a lady, who, without any accompanying paralysis, presented the following perversion of speech: "On receiving a call from a visitor, she rose to receive him with a benevolent smile on her countenance and, pointing to a chair, said — 'Pig, Brute, Stupid Fool.' Madame B— begs you to be seated, said a relative who was present." * * * Trousseau adds that the acts of this lady seemed logical and sensible, and, strange to say, she did not seem to be aware of the

foul language she was using.* This was apparently a case of word-deafness associated with paraphasia verbalis.

The fact that agraphia or paraphasia commonly accompany word-deafness, probably depends on the accompanying word-forgetfulness (paraphasia verbalis) which is common. Even in the absence of this audito-motor paraphasia or word-forgetfulness (see Fig. 4), the proximity and probable involvement of the word-vision centre (supplied by the same artery) would be liable to lead to some confusion in writing, since the patient must depend solely on his muscular sense memories of written words. It must be borne in mind finally, that word-deafness, is, of all the common forms of aphasia, the most susceptible of recovery to a marked degree; partly from escape of some portion of the word-hearing area or its entering fibres from destruction; partly from subsequent education of the corresponding area in the right hemisphere. The state of the patient's auditory perception therefore, *at a given time*, is an important point.

The general capacity of the word-deaf aphasic therefore depends on his ability to correctly substitute for the lost word-hearing some other sensory word image, derived through vision, smell, taste, tact or muscular sense; and to correctly express his wishes by means of *written* or *mimic* speech. In the case of sub-cortical word-deafness the *expression* may possibly be correctly accomplished by spoken speech, even though the patient does not hear his own words.

(2) **Amusia** is analogous with word-deafness, in that the musical notes are heard as sounds but not recognized as music. Its chief importance lies in the fact that it is likely to be associated with or to be followed by word-deafness and paraphasia verbalis, since the music hearing area is believed to lie immediately anterior to the word-hearing

*Bateman op. cit. pp. 201-202.

area in the first and second left temporal convolutions.*

(3) **Auditory apraxia**, or object-deafness, is characterized by non-recognition of objects by their sounds, as for instance of a dog by his bark or of a bell by its note. It may accompany the two preceding varieties or exist separately. The lesion is believed to be in the posterior portion of the first and second left temporal convolutions (A, Fig. 3, Fig. 5, 3), and to be more extensive superficially and sub-cortically than the lesion in pure word-deafness. Its chief forensic importance lies of course in its frequent association with other auditory aphasias.

(4) **Word-blindness** and

(5) **Object-blindness** are apt to occur together in varying degrees. The *lesion* is in the "angular gyrus" (Fig. 3 V.) No distinct line of demarcation is known to exist between these two forms of visual aphasia, though they are clinically distinct in some cases. Hemianopsia is apt to be an associated symptom in both, especially if the lesion be sub-cortical in situation or effect. The nature of the lesion may be either of the pathological conditions noted under word-deafness. *The effect* on the patient in word-blindness is that he fails to recognize printed or written words *as words* though he sees them as marks or lines. Likewise in object-blindness (also called "mind-blindness" and "soul-blindness", improperly, it seems to the writer), common objects convey no meaning of their *nature* or *use* when *seen*, though they may be at once properly appreciated if felt and handled, (muscular-sense recognition.)

Mere object-blindness must be carefully distinguished from *Anomia* (see No. 21), or loss of *name* memories, since a case reported by Mills indicates that the two are apparently distinct. (See note on p. 26.)

It is evident that verbal responsibility exists in these patients provided that the aphasia is visual only and that no

*Edren—Deutsche Zeitschrift für Nervenheilkunde Vol. vi (Analysis of 52 cases.) Quoted by Frankel Journal Nervous and Mental Disease. xxii—123. 1895.

serious mental defects complicate the case. Also, that testamentary capacity remains, so that the person may properly dictate the items of a will, or the terms of a contract, and carry on business of such a nature that he is not required to read or to judge of objects by sight.

It must be noted, however, that the inability to read, renders him peculiarly liable to fraudulent impositions; and that in the case of will making, the witnesses should be especially well qualified, should understand the terms of the document and satisfy themselves that the testator understands it, by reading it aloud to him, in addition to the ordinary witnessing of the signature or mark of the testator.

His signature, being made by the aid of the muscular and "graphic" memories, is of course acceptable; though he may be unable to read it *by sight*, he can do so by the hand-movement (*muscular sense*) memories of directing the pen.

Such a patient may also make a holographic will and read it in the same manner as he produces it.

(6) **Visual Amimia** or pantomime blindness needs only to be mentioned in this relation. It is not yet recorded as a separate type. The patient would be unable to recognize mimicry of words or ideas. The condition must be very rare, since it seldom accompanies even complete auditory and motor aphasia combined with some visual aphasia. The most probable seat of the lesion would be in the post-parietal region behind the motor areas proper and it would seem almost necessary for the lesion to be bilateral.

(7) **Cortical Anosmia** (smell-memory loss) and

(8) **Cortical Ageusia** (taste-memory loss) would also probably require bilateral lesions situated in the "tip" of the temporal-lobes, inner surface (uncinate gyrus). Their medico-legal importance would be, of course, unimportant.

(9) **Word anæsthesia.**

(10) **Pantomime anæsthesia.** Pure cases of these forms of aphasia have not so far as the writer is aware, been reported. The location of the lesion which would cause these disorders is as yet uncertain, the tactile-, muscular-, and temperature-sense areas being considered by some investigators (Starr, Ransom, Dana, Mills, Lloyd, Deaver,) to be situated in the post parietal area (Fig. 3 above V) adjoining the motor convolutions for the trunk and extremities; by others (Horsley, Schafer, Saville, Ferrier, Yeo) to also extend to the limbic lobe (gyrus fornicatus), and hippocampal gyrus on the inner surface of the hemisphere. (Fig. 6. Above and behind "callosum.")

(11) **Myotactic apraxia** or object anæsthesia. It is quite conceivable that, in the case of the finer tactual manipulations, as in reading the blind alphabet, etc., there may be—probably is, a specially educated center on the left side, corresponding to the other language areas. A case illustrating the probable relation of the post-central (ascending parietal) and parietal gyri to finer tactile and muscular sense perceptions recently came under the writer's observation through the kindness of his colleague Dr. N. P. Dandridge. The man had his skull fractured by a brick, the wound involving the left parietal area and necessitating the removal of a triangular area of bone (about two and one-half inches in extent in each direction) over the leg and arm regions of the cortex. The dura was not opened. There was marked motor weakness but no speech defect following the operation. The motor weakness affected the right leg, arm and face muscles, diminishing in severity in the order named.

Complete loss of voluntary power over the anterior leg muscles existed, simply marked weakness of arm and face movements as compared with the opposite side.

The kneejerks were present, somewhat over active on both sides.

With his eyes closed it was impossible for him to name correctly coins and common objects with his right hand; or

even to tell their general form. He said a coin, for instance, was a "half moon". With his unaffected hand he could not only name the shape but the value of the coin.

As the case progressed favorably the return of power in the right leg, arm and face was complete in two weeks and was accompanied by return of muscular sense, so that coins and other objects could be correctly named with either hand. Burr* records a well-marked case of this form associated with visual apraxia, and refers to another. In neither case were ordinary touch, pain or temperature sensations deficient. While no precise localization of this rare lesion can be made at present it is reasonable to infer that it is not far from the angular gyrus (see 11 fig. 5).

The *effects* to be expected from tactile and muscular sense lesions are of course unimportant in a legal sense, excepting in the case of blind deaf-mutes, communication being then possible only by a very limited pantomime, which would itself be impaired if not abolished by the muscular sense lesion.

THE INTERMEDIATE OR "CONDUCTION" APHASIAS.

Our second group, the *Intermediate Aphasias*, are commonly known as "conduction" aphasias, which term was used by Wernicke to designate errors in the *transmission* of sensory language images from the receptive to the emissive (motor) areas. By some (Bastian) they are referred to as "Commissural Aphasias." Both terms seem objectionable to the writer, since "conduction" may also imply a lesion in the tract *from* the motor centres to the basal ganglia (sub-cortical and capsular lesions); and commissural is equally open to objection as applicable to the connections between the two hemispheres which are commonly known as commissures. The term "intermediate" is here used therefore in a functional sense to indicate the chronological order of the processes involved. The "intermediate" aphasias, in

*Journal of Nervous and Mental Disease, May, 1897—260.

this sense comprise the Paraphasias in general, together with anomia or concept aphasia. The leading characteristic of the paraphasias is that spoken word-sounds, visual word-appearances, etc., are correctly *received*, recognized and *retained* in their appropriate areas, but are *lost in transmission* to the motor areas. Hence the word emitted is not properly related to the word received; or wrong words are emitted unintentionally. "Amnesia verbalis" and "Amnesic" aphasias are terms that have been applied to these forms, but amnesia (memory loss) at the receptive area does not really exist as above explained; it is transmission to and *re-collection* at another (psychic or motor) centre that is at fault. In other words, the train starts but does not arrive, owing to imperfection in the track. The patient can hear, understand and speak correctly, but his answer is apt to be ill-chosen and irrelevant to the question asked; at the same time he is aware of the irrelevancy though he cannot correct it by spoken words.

Non-re-collection aphasia would be a good name for this type.

Word-deafness is necessarily accompanied by paraphasia (word-forgetfulness) but the converse does not hold true as numerous cases attest. This is apparent from the diagram (Fig. 4) which illustrates the locations of the lesion in the types of word-deafness, word-forgetfulness and motor aphasia.

From this it is apparent also that sub-cortical lesions may give rise to *conduction* defects, without any loss of word re-collection. In other words paraphasia properly is a defect of association not of conduction in its general sense.

(12) **Spoken-word forgetfulness** as an isolated form of aphasia, is due to a lesion in or beneath the insula (Island of Reil) as shown in the diagram (Fig. 4.) It causes the patient to utter words incorrectly or irrelevantly to those received. He recognizes his errors however by means of the intact word-hearing area; though unable to correct them

by *spoken* speech he may do so by writing or pantomime. This is an important difference between this form and simple word-deafness, since in the latter the errors are unrecognized and go uncorrected.

Not only may a definite and demonstrable lesion cause this and other forms of Paraphasia, but simple "general enfeeblement" of the brain (Wyllie) may also be attended with like results. This is one explanation of the existence of word-forgetfulness in advanced age and also as following exhausting diseases. In such cases we must assume an impaired nutrition in the associative (intermediate) mechanisms, or neuron-processes.

(13) **Paramusia**. Musical-sound forgetfulness.

(14) **Auditory Parapraxia**. These possess merely a scientific interest as possibilities.

(15) **Paralexia**. Non-re-collection of word meanings, or loss in transit to emissive areas may apply to printed and written words (paragraphia) separately, hence both should be tested. The pure form would probably be due to a sub-cortical lesion, beneath the angular gyrus. (Fig. 3 V. Fig. 5, 15).

(16) **Visual Parapraxia** would be similar in effect and location as the preceding (15) object defect being substituted for word defect.

(17) **Parosmia** and

(18) **Parageusia** would possess clinico-pathological importance only. (See 7 and 8 for probable location, etc.)

(19) **Myotactic Paramimia** (pantomime forgetfulness).

(20) **Myotactic Parapraxia**, (object-touch forgetfulness) need only to be mentioned as possibilities. They would probably bear a sub-cortical relation to the areas affected in Myotactic amimia and apraxia (post parietal convolutions?)

The legal relations of the various types of Paraphasia will naturally vary within wide limits and cannot be definitely outlined. The actual state of the individual case and the concomitant circumstances must be carefully

weighed in every such instance. A simple paraphasia verbalis is not in any way incompatible with holographic will-making since the auditory and visual receptive centres are both intact and may still be in relation with the graphic area. A deep lesion of the Insula however, in audito-motor paraphasia (spoken word forgetfulness) may also cut off the communication with the graphic area, in which case the visuo-graphic mechanisms may not suffice for correct conveyance of ideas. It must be borne in mind moreover that deep lesions of the insula are also apt to affect the striate body and the internal capsule and in this way interfere with graphic as well as spoken emission on the same side. Even this would in some cases leave the opposite graphic motor area (for the left hand) available for simple written expressions of assent and dissent at least.

Finally, of the entire group of paraphasias it may be said that they rarely occur alone. They are most likely parts of an extensive lesion and consequently accompanied with much diminution of intelligence and confusion of thought (Kussmaul). Again improvement may occur so as to materially change the decision in a given case, at a subsequent examination. They may also lead to questions of competency to pursue a given occupation—a physician for instance afflicted with paraphasia verbalis or paragrammia may write a prescription for the wrong medicine or dose.

(21) **Anomia** (name-memory loss) has yet to be located as a pathological entity.*

(22) **Paranomia** (name-forgetfulness) as already explained. (See foot note p. 26), the case reported by Mills as evidence of the existence of a special naming centre in the left third temporal convolution, seems to belong to the group of

*The case reported by Mills (*Text-book of Nervous Diseases*, Dercum, 1895, p. 427), would appear to the present writer to be one of Paranomia (name *re-collection* loss), rather than Anomia proper; since the patient recognized the names as correct *when they were spoken to her*.

paraphasias (non-recollection of names) rather than to name absence.

THE EMISSIVE OR MOTOR APHASIAS.

These, the first recognized and best known of all the language defects are also of greatest practical importance in a legal sense, since in the vast majority of persons probably, the *construction* of a word in a psychic sense, usually, if not always precedes its spoken or graphic utterance; probably also in many cases its pantomimic utterance. While it is claimed by some* that *pantomime* is the original elementary form of speech, the fact remains that in civilized man, spoken speech has supplanted it to such a degree as to cause a natural de-volution of pantomime by disuse.

While as above stated the motor aphasic is also usually agraphic he is not invariably so. The exceptions are generally believed to be due to the sub-cortical location of the lesion, (see Fig. 1) hence the actual word planning area (M. Fig. 3, also 3d. frontal convolution, Fig. 4.) is not destroyed but has lost its path of emission to the word utterance mechanisms. It may still be in communication with the graphic centre, (2d. Frontal Fig. 3 G) and hence the power of writing may be intact for practical purposes.

Still another and perhaps better reason for the retention of graphic expression after loss of motor speech, lies in the probable subdivision of the motor-speech processes into two distinct areas—namely psycho-motor and executive motor as indicated in our scheme of aphasias on p. 16a.

Cases cited by Broadbent and Mills† appear to warrant this separation on clinico-pathological grounds. Wyllie (op. cit. pp. 317, 318) also alludes to this separation of func-

*Vossius, Kleinpaul—quoted by Bateman op. cit 170-171.

†Mills. Aphasia and the Cortical Mechanism of Speech—A Text-book on Nervous Diseases by American Authors. Dercum Phila. 1895, p. 434.

tional areas as a possibility and (p. 328) reports a case, bearing on this interpretation, but without autopsy.

A case of the writer's furnishing strong additional evidence of separateness of these two functions of word-construction and word-utterance, is here added.

J. B., colored, aged 55, a tobacco warehouse porter by occupation was admitted to my service at the Cincinnati Hospital on January 6, 1896. Power was good and equal in arms and legs. Jawjerk and double elbow-jerks present with slightly increased knee-jerks. No pain or tenderness. Heart and urine normal.

On arrival he was conscious but mentally confused and gave irrelevant answers to questions, usually answering all questions with "yessir" (paraphasia verbalis). He seemed to understand what was wanted and was apparently much annoyed by his wrong answers, especially when asked his name, which he was totally unable to give until prompted. Asked if it was "John Smith" or other erroneous name he would shake his head negatively; on pronouncing "Jackson Butler" however he at once brightened and assented vigorously; and with some difficulty and slowness said "Jackson Butler." Once said, he repeated it over and over frequently, seeming to fear to lose it. Words received were evidently understood; common objects were correctly pointed out and their uses comprehended though their names could not be pronounced voluntarily, but words pronounced to him could be repeated immediately in the case of some words.

A notable exception to this last statement, was the word "no." On being asked to say "no" he seemed to make a severe mental effort and finally said "I can't say no." Gowers* records an instance identical with this in a case of motor aphasia. This was after he had been in the hospital for two days and had increased his vocabulary in several directions.

*Manual of Diseases of the Nervous System, 1893, p. 113.

Unfortunately his writing could not be tested on account of his lack of education in that direction, but he could make printed letters A, B, X, etc., from a copy; could pick them out of a group, but could not write them at command, and seemed fairly intelligent for his calling and station in life. Diagnosis—cerebral thrombosis involving 3d frontal convolution.

In a month he was discharged practically well so far as his conversational needs were concerned, but could not pronounce words like "Constantinople," "Generalissimo," etc.

He returned to his occupation, at which he worked successfully for seven months, when he was re-admitted to the medical ward of the hospital for an attack of "diarrhoea." On admission his pulse was 96, temperature 97.6, respiration 16. Urine contained albumen and sugar. Thirteen days later he was reported "improving;" and while sitting at the breakfast table, suddenly fell to the floor unconscious, with right hemiplegia (face arm and leg). Temperature 98.4, pulse 80, respiration 24. Pupils dilated, irresponsive; conjugate deviation of eyes to left. No vomiting; no convulsions. Transferred to Neurological service. Four days later he seemed to recognize and follow movements of objects with eyes and head; was mentally brighter but did not recognize his spoken name; could hear sounds.

Diagnosis: Cerebral thrombosis of left middle cerebral artery involving branches to motor speech and auditory speech areas, with the central motor convolutions. He gradually sank and died on the thirteenth day after his stroke.

Autopsy by my colleague Dr. J. H. Landis, September 16, 1896.

The foot of the left third frontal convolution, (Fig. 3 M.) (Word-planning area of Broadbent and Wyllie) was occupied by a cyst the size of a small cherry containing a whitish diffuent material (old "atheromatous abscess.") The branch of the Sylvian artery leading to it was obliterated

(inferior external frontal.) This lesion was evidently the cause of the first attack of motor aphasia nine months before, and explains the presence of pure voluntary motor aphasia (word-construction loss) with retention of the power of repeating words to dictation at that time, by means of the "word-utterance" area (of Broadbent and others) in the foot of the central convolutions.

The second attack of complete auditory and motor aphasia with hemiplegia was explained by an extensive recent red necrotic softening involving the left central and first temporal convolutions, the insula, and the striate body. The larger blood-vessels throughout the brain were the seat of extensive arterio-sclerosis.

Motor aphasia, as shown by the first attack in the above case, is capable of improvement; even of apparently complete recovery in some cases. This improvement is due to two factors—viz: (a) recovery from pressure of an undestroyed portion of the third left frontal convolution. (b) Subsequent education of the right third frontal, previously dormant. In children this latter mode of recovery is often so complete, that in after life no language loss is observable.

Taking up *seriatim* the various types of motor aphasia indicated in our table we have:

(23) **Psychic motor aphasia** or spoken word-construction loss (loss of word-plans or psychic spoken-word memories). This, as shown by the above case and others recorded, has probably a distinct existence as a separate form.

The *lesion*, as just cited, is situated in the "foot" of the left third frontal (Broca's) convolution (Fig 3 M—*anterior half of shaded portion*. Also Fig. 4.)

The *cause* is most commonly a vascular occlusion (embolism, thrombosis), hæmorrhage or traumatism. The *effect* on the patient is a loss of the power to *frame ideas into words*. The ideas, made up of sensory receptive combina-

tions exist, but the vehicles for their arrangement for expression are absent. (See Fig. 1—spoken-word plan.)

As already stated (*vide ante*) the motor aphasic is usually also agraphic if the lesion is in the word-*planning* area of Broca's convolution as it commonly is. (a) Should the lesion be limited to the word-*utterance* portion of the motor area (see Fig. 4, central convolutions) it seems quite possible that word-planning may still exist and that the plans may be transmitted to the psycho-graphic centre and from thence to the motor-graphic area for emission as written speech.

(b) Should the lesion however destroy the word-planning area itself, nothing remains with which to express his ideas but *pantomime* pure and simple. Pantomime probably does not primarily express *words*, but the *ideas* which precede word-planning and word-utterance; in this sense it is more elementary than spoken speech as is also evident from its extensive use by infants and savages.

Testamentary capacity is evidently not abolished by either of the two conditions just mentioned, since in the first writing and pantomime and in the second pantomime expression would remain. In both, the receptive sensory areas and their intercommunications are intact so that ideas based on them are correctly formed.

Simple business acts, such as required only the expression of assent and dissent, would also be valid in such a case for similar reasons. The main questions to be settled are: (a) Does the patient comprehend the nature and relations of the proposed act? (b) Can he express assent and dissent with certainty? Numerous cases of motor aphasia possessing important legal relations are on record, of which the following cited by Bateman (op. cit. 301 *et seq.*), may be here referred to.

"As far back as 1743, long before the attention of the profession had been directed to the subject of aphasia, a resident of Muenden, who was deprived of the power of speech,

applied to the Hanoverian government for permission to make a will in favor of his wife by means of signs; and the court acknowledged the validity of the act.*

The fact of the will in this case having been made by means of *signs* (pantomime) is susceptible of one of two interpretations.

(a) That the testator had never learned to write; (b) that the lesion also involved the written word-planning area and consequently was accompanied by *agraphia*.

(24) **Executive motor aphasia** or Word-utterance loss, without loss of word-planning capacity, may be due to a lesion in either of two locations: (a) a cortical lesion, situated at the "foot" of the pre-central gyrus, (ascending frontal) immediately adjoining the foot of "Broca's" convolution proper. (b) To a sub-cortical or capsular lesion blocking the motor emissive tract on its way to the bulbar nuclei. Simple word-utterance aphasia is obviously of less importance in every way than the preceding form (word-construction loss.) The liability of the lesion to also damage the immediately underlying *insula* however and thus cause a paraphasia verbalis (see ¶ 12) must be borne in mind. Even then graphic and pantomime utterance would probably remain and would be sufficient for will-making and the transaction of uncomplicated business. In other words, the subject of simple *word-utterance aphasia* can receive, understand, and convey assent or dissent by writing and pantomime to propositions put before him by spoken, written or mimic language. "An aphasic discharged during a period of five years the functions of Mayor and of Municipal Councillor, by simply writing his name to the necessary documents, which he had learned to do with his left hand. He also, with his *left* hand wrote, at intervals, a holographic will, perfectly correct in every respect; the validity of this document was recognized by the law court.†

*Hofbauer—*Traite de Medecine Legale*, Paris, 1827.

†Billod—*Annales Medico-psychologiques*, tome xviii,

This case would appear to be one of lesion of the word-utterance area, involving also the graphic connections or their sub-cortical emissive fibres of the *left* hemisphere; the word-planning area being intact and its productions transmitted to the *right* hemisphere (graphic area) whence they secured outlet through the ordinary channels to the left arm and hand.

Another case, illustrative of the combination of motor aphasia and agraphia, with hemiplegia as well as of the importance of small details in a legal sense is as follows. "The testator, the Rev. J. T. L., a widower, 63 years of age, was engaged to be married, when he was suddenly seized with right hemiplegia and aphasia. Although unable either to speak or to write, he could make himself understood by those around him by signs; and by the language of gesture he succeeded in conveying to his medical attendants that he desired to make a testamentary disposition in favor of Miss R., whom he had intended to make his wife. A card was procured and upon it, by the direction of the testator, the following words were written: "£30.000 to Miss R., to be tied up to her for life, and after her death to come back to my family, and be divided fairly and equally. This document was written by one of the medical attendants; the testator then made a mark, not at the bottom, but in the middle, of the card, through the word 'life'; one of the doctors then wrote diagonally from this mark towards the right hand upper corner of the card, the words 'Mr. L's mark', and they both attested the execution of the document by placing their initials on the back of the card, with the words 'Witness to mark', and followed by the date, November 20, 1885." Evidence was produced to prove that he showed this card to the lady whom he had intended to benefit, telling her (by signs probably L.) that it was for her, and that he wished her to keep it.

"The mode in which the testator communicated his wishes was as follows: He made signs for writing materials; his

wishes were interpreted by means of signs, and then written down on the card. He held up his hand, extended his five fingers, and was asked if he meant 'thousands,' he bowed assent. He then closed his hand, and opened it in the same way, implying ten; this operation was repeated until it amounted to thirty, and he then dropped his arm down. Testator was then asked whether he wished Miss R. to have thirty thousand pounds, and he nodded his head."

"In order that there might be no mistakes about his wishes as to details, he was asked whether Miss R. was to have this sum absolutely; he signified dissent, but on being asked if it was to be hers for life and afterward revert to his family, he bowed his head."*

Bateman's comments on this case are: "It will be observed that the nature of the testator's wishes was ascertained principally by putting questions, to which he signified approval or dissent by nodding or shaking his head as he lay in bed. From a consideration of the above facts, it seems clear that the witnesses did correctly interpret the meaning of the testator's signs, which evidently expressed his testamentary wishes; his gestures answered to rational conceptions, and were therefore external but not oral manifestations of the *verbum mentale*; and this view was taken by the President of the court, who held that the writing on the card constituted a valid testamentary document, that the writing of the witnesses on the back of the card was also a sufficient attestation, and that the will would have been allowed to stand *if the testator's mark had been placed at the bottom or foot of the card*;† but as the mark was made in the middle of the card, its position was not such as to satisfy the provisions of the Statute of the Wills Act (iv. Vic., Chap. 26. sec. 9) or of Lord St. Leonard's Act (xv. Vic., Chap. 24 sec. 1) and the instrument was not duly executed, and consequently not entitled to probate, which was accordingly refused."

*Law Reports, Probate Division, Vol. xii, 1887, p. 8. (Great Britain.)

†Italics by present writer.

It is hardly necessary to remark that the defect in the document was not due to the speech defect, but to a simple error of legal technique.

One more case, evidently of damage to the spoken word-utterance and written word-planning areas, and bearing on the question of capacity to manage ordinary business affairs is the following: As Bateman remarks "it is all the more interesting as it formed the subject of a formal discussion in a scientific body, perhaps the most competent in Europe to deal with this question—La Societe de Medecine Legale de Paris."

"A merchant aged 62, having acquired a fortune in his business, was attacked with right hemiplegia and complete aphasia. After some months of treatment, including a season at the baths of Balaruc, he improved so as to be able to walk, although imperfectly; the arm however continued quite paralyzed, and the aphasia persisted. Later on the paralysis in the arm yielded somewhat, but the power of speech was limited to the sounds—O, o, a, qui. Whatever was said to him he replied by these same syllables; but he was able to make himself understood by articulating these words with different intonations, accompanied by very expressive signs executed by the head or by the left hand. His wife, more accustomed than others to his language, interpreted what he wished to say; and if she happened to convey a wrong notion of what he desired to say, he showed great irritation, and endeavored to make himself better understood by more expressive gestures. As his right hand was paralyzed, he had learnt to write with the left hand; but if left to himself *he could not write spontaneously, without copying*—he required a model under his eyes, and could only recopy what was written and set before him.

"In order to test the degree to which he had retained his intelligence, it was pointed out to him that it would be to his advantage to collect his rents every month, instead of allowing them to accumulate for six months; he indicated

very clearly that he understood this advice, and that he entirely approved it, and he informed his wife that for the future he wished his rents to be collected in the manner advised."

"It was evident that, in spite of his speechlessness, he had in a great measure retained his intelligence and his power of volition, and he knew perfectly well the state of his affairs. He frequented places of public resort, and would pay for what he ordered without making any mistake; he was in the habit of seating himself near those who were playing at cards, and he would intimate his approval or disapproval of their playing, and even venture upon advice by means of signs, which testified to the preservation of his intelligence."* The relatives of this gentleman had demanded what the French Law calls an "interdiction," and after a prolonged discussion, the Societe de Medecine Legale decided that his condition did not justify his being deprived of his civil rights; and the Tribunal at Avignon, to which the case was subsequently submitted, gave a decision in conformity with the views of the "Legal Medical Society."

Bateman's comments in this case are: "There cannot be a doubt about the propriety of the above decision. This gentleman was the subject of motor aphasia; he was unable to express himself by articulate language, but he possessed to an eminent degree the language of signs. It will be observed that he was also the subject of agraphia, for although he could copy, he was unable to give spontaneous expression to his wishes by written language; he could originate nothing in writing; if his model were withdrawn he was incapable of writing a single letter."

Hence his aphasia was of two distinct types, according to the scheme here adopted—viz: (24) Executive Motor Aphasia and (25) Psychic Agraphia, implying lesions respec-

**Annales d'Hygiene Publique et de Medecine Legale*, tome xxxi. p. 430.

tively of the foot of the ascending frontal (pre-central) and of the second frontal convolutions—or of their sub-cortical communications.

Diller* has recorded two cases of motor aphasia probably of the executive form with legal bearings as follows :

A retired physician aged 60, had an attack of right hemiplegia with aphasia, recovered and transacted important business affairs for years. His will was contested on the ground of incompetency as having been made after his paralytic attack. During the trial a second will made some years *before* his aphasia was produced, which agreed so well with the disputed one that the legal proceedings were terminated.

The second case, a lady aged 63, also had right hemiplegia with incomplete motor aphasia. The doctor believed that she was incompetent to enter into civil contracts or to receive and pay out money constantly as her business required, but that she was able to give intelligent assent or dissent to any single business proposition and to give a power of attorney to her children.

(25) **Psychic agraphia** (written-word-construction loss). The existence of actual proof of this type has been questioned.†

Since that date, however, Eskridge‡ has put on record an undoubted case of this form where the patient, though unable to arrange letters into words, "wrote a good legible hand when the words were spelled for him." Operation and removal of a cyst from the foot of the left second frontal convolution, much improved his power of spelling and voluntary writing. A second case is quoted in this article (*vide ante* p. 36.)

The legal bearings of psychic agraphia would be limited to the consideration of possible errors in written documents.

*Journal Nervous and Mental Disease, May, 1894, p. 293.

†Mills, "A Text-Book on Nervous Diseases by American Authors, 1895," p. 436.

‡Medical News, Philadelphia, August 1, 1896, p. 122.

In every other respect the purely agraphic are competent legally if sane.

(26) **Executive agraphia** (written-word-utterance loss). This form in itself is of even less importance legally than the preceding. The lesion may be located either in the left arm and hand area, immediately posterior to the 2d frontal convolution, or in the centrum ovale or internal capsule, thus impairing conduction to the spinal centres. In the latter case compensation would probably be established in some degree by way of the callosum so that intelligent writing could be effected by means of the motor centres of the opposite hemisphere.

(27) **Psychic motor amimia** or

(28) **Executive motor amimia**† alone would be of even less importance than the Agraphias and do not require consideration here.

IRREGULAR AND MIXED FORMS OF APHASIA.

It is important to bear in mind the possible, even probable, presence of "mixed" forms of aphasia in any given case, due to the fact that the same artery (middle cerebral) supplies, through its various branches, the Auditory, Visual, Motor, Graphic and probable Pantomimic cortical areas.

Occlusions of branches of this vessel are apt to give rise to a confusing association of the various forms of speech defect as well as the extension of a given area of necrotic softening from time to time by occlusion of additional branches of the same trunk. Thus in the case of a man aged 41, a tailor by occupation, recently under the writer's care, there appeared in succession, during a period of six months, (a) Motor aphasia psychic and executive, (involve-

†Grasset (*Le Progres Medical*, 1896) records a case of Motor Amimia in a congenital deaf-mute. The patient had lost the power of expression by the sign language with the right hand, but retained the use of the left for language purposes. See *Jour. Amer. Med. Assn.*, Nov. 28, 1896, p. 1162.

ment third frontal and precentral gyri). (b) Paraphasia (insula) i. e.: patient replies to all questions with the one expression "Doneshes" (Gibberish Aphasia). (c) Paragraphia (probably in this case capsular in location) since with his left unparalyzed hand he made an attempt, partly successful, to write his own name, and could reproduce it so as to be recognized from a written copy.

(d) Auditory Aphasia or word-deafness (first temporal) not recognizing eventually such words as hand, head, eye, etc. though when he first came under observation he could pick out button, coat, pencil in addition to parts of his own body at command.

(e) Visual Aphasia, word-blindness at first and object-blindness later (angular gyrus). While at an early stage of his illness he could select his own written name from a group of others, he could at no time point out the individual letters composing it, nor put them together to form the name. (Aliterarum without complete Alexia). Later he lost all recognition of written or printed words, his own name included. He could recognize the uses of some objects with which he was familiar, as shears, and when given a dressing forceps and cloth with signs indicating that he was to cut the cloth, he smiled and pointed to the absence of cutting edge on the forceps. Given a bottle and a cork together, however, he failed to connect them in any way; and much effort and uncertainty were manifested before he recognized the use of a watch key.

(f) Paramimia, due in part at least to the right hemiplegia which accompanied his aphasia. Facial and emotional expression were well preserved; smell blunted and taste apparently almost absent, so far as could be determined. These defects left the patient on the receptive side (see Fig. 5, No.'s 6 and 10) the muscular and tactile senses (uneducated for words in his case) with temperate sense and pantomimic appreciation. On the emissive side only emotional expression and pantomime remain and the latter impaired

by the right arm palsy, though he looks intelligent and shows an earnest desire to express his wants. The constantly recurring utterance of the expression "doneshes" (gibberish aphasia) with a lively attempt at pantomime by the facial muscles and left arm and hand, with obscure vocal sounds were all that remained of the language faculty. In addition he could manifest emotional expression to a considerable degree, smiling when shown a comic picture unexpectedly. He does not seem to have full appreciation of his deplorable state, as shown by the absence of marked mental depression. The lesion in this case is probably vascular occlusion (thrombosis) gradually involving additional branches of the left middle cerebral artery. In every legal aspect of course the words incapacitated and irresponsible apply to this case.

Other "irregular" varieties of aphasia requiring separate consideration are those of temporary character. Those due to feebleness and exhausting illnesses have been already mentioned. Other forms are the Epileptiform and Hysterical. Bateman (op. cit. p. 136) cites an interesting case which he classifies as Epileptiform, but which many would be inclined from the history to consider Hysterical. "The salient features were total loss of speech of an intermittent character, lasting from a few hours to six weeks; the suspension of the faculty of articulate language always coinciding with pain at the nape of the neck and its restoration being invariably accompanied by pain in the lumbar spine." "True hysterical" (or cortical functional) aphasia does occur however, not including in this term the simple loss of *voice* so common in hysterical conditions; this latter is aponia, but not aphasia.

An example of recurring attacks of functional cortical ("hysterical") aphasia occurred in a patient of the writer's, a widow, 46 years of age, who was passing along a crowded thoroughfare with a satchel containing several hundred dollars, the proceeds of the sale of her entire property.

The satchel was snatched from her hand by a man who escaped with it. From that moment she was speechless, not simply voiceless but appeared to lack the power of cerebral word-construction. She also manifested in a marked degree the emotional temperament, contracted visual fields and other "stigmata" of the hysterical constitution. Under general nutritive and hygienic measures she recovered in a few weeks, but has had two recurrences, from slight causes, both yielding to treatment in a few days. One of these attacks followed a fall with unconsciousness according to her statement. The absolute speechlessness in the first attack, prevented out-cry and was the cause of her failure to secure assistance in stopping the thief. During these attacks, questions of legal competency might easily arise. Between the attacks, however, there can be no doubt of the patient's capacity to conduct ordinary affairs with average judgment for her station in life. She earns her living as a seamstress and is in every way logical and proper in her conduct.

To sum up, it is apparent from the foregoing remarks on the genesis and nature of speech and its disorders, that the inter-relations of the individual and his environment as regards language, depend on three factors (see Fig. 1): First, sensations received from without and recognized as percepts by the brain.

Secondly: Concepts or ideas formed by the brain from association and combination of these percepts.

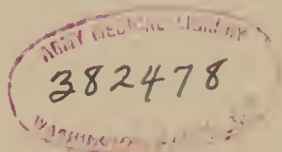
Thirdly: Motor expression of these concepts or ideas by spoken words, written words, pantomime, and by vocal sounds that are not words, as shrieks, exclamations, etc.

Disorders of either series of processes will impair language as a whole. The legal results of this impairment depend on its *degree* and *nature* and may be summarized as follows:

Sanity established, any legal document should be recognized when it can be proved that the person making it can

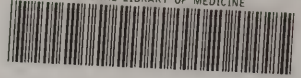
understand fully its nature by any receptive channel, (viz : hearing, vision, or muscular sense) and can, in addition, express assent or dissent with certainty to proper witnesses; whether this expression be by spoken speech, written speech or pantomime.

As regards responsibility and competency for other acts than signing a will or document, the form of language disorder present, and its relations with the nature of the act must be carefully considered. In other words cases of this latter class must be individualized rather than generalized.



72

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